



International price levels and global inflation

Michael WARD, Cambridge - England

Agenda item n° 11

JOINT WORLD BANK – OECD SEMINAR ON PURCHASING POWER PARITIES

Recent Advances in Methods and Applications

WASHINGTON D.C.

30 January – 2 February 2001

INTERNATIONAL PRICE LEVELS AND GLOBAL INFLATION

1 Introduction and Issues

1. What is global inflation? And why does it matter? To date, little interest has been shown in this topic and answers to these apparently simple questions are not entirely straightforward. Although much depends on the particular perspective taken by the individual investigator and the objective of enquiry, global inflation in its simplest term measures the average aggregate rate of increase of national prices across all countries.

2. In itself, however, a country's rate of inflation is of key interest to that nation's policy makers. But it is not solely a matter of domestic concern nor only a question of the extent of imported inflation as traditionally perceived, i.e. the country's dependency on international trade in commodities. Over and above this, there has been an inexorable rise in prices, on average, in all countries over the whole of the 20th Century. No research has been carried out to try and determine what are the fundamental forces at work that have brought about these global price rises. Clearly, some core but as yet unidentified real behavioral factors have influenced the overall increase in world prices. It is possible that a continuing global imbalance between the demand and supply of resources as an invariable accompaniment of growth may have pushed up prices. Additionally, large amounts of laundered or otherwise dirty money seeking safe refuge could have exerted added pressure on price levels. More likely, however, expectations about the desired rate of return on capital may have risen, while national indebtedness has run ahead of a capacity to repay loans.

3. Technically, and perhaps at a somewhat superficial conceptual level, the actual measurement of global inflation is relatively uncomplicated. It is, in aggregate, little more than an expenditure based weighted global index of observed (reported) national price increases in all countries. But global inflation comes about in two ways being part 'transnational' and part 'international'. First, it is affected by an unidentifiable core trend element that is influenced by a combination of transnational phenomena and economic variables which tend to drive up prices in general. Second, global inflation is 'international' primarily in a polystatist, or multi-national sense in that it is determined by the existing structure and pace of average national price change in all countries. It is strongly influenced, of course, by the prevailing rates of inflation in the World's largest economies. In this respect, therefore, a decision in any one of these major economies, say, to fund increased domestic public expenditures by running up government deficits and public debt, will have an adverse effect on measured global price change, though it may not be responsible for, nor contribute to, the underlying factors that drive global inflation.

2 The Relevance of Global Inflation

4. Before analysts can consider why an economic phenomenon occurs, it is first necessary to review how it happens and is manifested in its measurement. The issue of global inflation is likely to assume growing importance over the forthcoming decade if the World's institutions find themselves increasingly incapable of managing international financial crises and controlling monetary instability. The risk of international volatility grows more likely with the extensive fiduciary involvement of a wide variety of banking agents and intermediaries in very different cross-border financial transactions. Some observers contend that, without adequate contingent reserves, the collapse of confidence in a key currency and an accompanying over-exposure of foreign exchange traders, hedge fund managers, commodity dealers, and

currency speculators will initiate such a crisis. Alternatively, a dramatic slump on one of the major international stock markets or the meltdown of a weak and extended banking system in a major trading economy will also lead to a significant flight of capital and an upsurge in global inflation. It will probably also cause the price of gold to escalate rapidly as ordinary citizens seek refuge in an inflation proof safe haven. This is despite the recent experience of historically low rates of inflation in most industrially developed countries. The introduction over the past decade of new instruments of monetary control, stricter IMF surveillance and closer data monitoring, as well as more prudential capital reserve accounting is designed to minimize the risk of such an event occurring. Strengthened requirements for improved information transparency also support these efforts.

5. Interest in international price changes is expanding for more mundane daily operational purposes and routine business management reasons. Greater knowledge about international price movements has become increasingly relevant to global product marketing and corporate investment decisions. Given the globalization of trade and production, the monitoring of price changes in the international economy is essential to understanding different market situations and relative competitive performance at both the corporate and national level. Large enterprises operating internationally also need to establish salary standards for their overseas staff as well as set appropriate global product prices. The relevance of benchmarking national and regional price changes against some standard numeraire is not lost on international entrepreneurs balancing global markets.

3 Concepts, Definitions and Measurement Concerns

6. This paper discusses what concepts of international [and corresponding national] price change are useful from both an analytical and operational policy point of view. But is the question of quantifying global price change really only a problem of trying to measure national inflation better? Or is it the need to pay closer attention to weighting each country's price change more appropriately? More fundamentally, it may be more a matter of deciding against which stock of international [asset] values does a measure of global inflation make sense. Perhaps another interesting sideline to these questions is whether the price of gold will begin to assume its former significance as an independent standard representing an internationally acceptable store of value that remains mostly uncontaminated by the wildly fluctuating nature of what goes on in the World's financial markets.

7. Conceptual and behavioral issues aside, the following paragraphs concentrate specifically on the global measurement concerns. Comparisons of international price levels and purchasing power parities play a key role in helping to resolve these questions. The paper touches only tangentially on some of the potential causes of global inflation, a subject on which far more research is needed. For economic as well as statistical reasons, it is suggested that global inflation is most appropriately measured by the difference in the average international price levels between two dates. Ideally, these should be two dates [years] in which independent simultaneous cross-country price collections in the same countries have been carried out under the ICP [International Comparisons Program]. The resulting measures need to be modified to the extent they are influenced by the real rate of growth that has occurred in different economies.

8. The ICP has been the primary vehicle for the calculation of different national expenditure purchasing power parities [PPPs] in various benchmark years. PPPs, calculated for a specific time period which is usually, but not exclusively, taken as a calendar year, provide the basis for converting major economic aggregates denominated in local national prices into values reflecting their equivalent international prices. In this respect, PPPs thus equalize price levels between countries and allow meaningful direct comparisons of important economic aggregates to be made on an international basis in real terms. At some later benchmark date, new PPPs will be calculated to see how, and in what way, these real aggregates have changed relatively between countries. But for time series analysis, the two base reference periods will not be directly comparable because, between the dates in question, the aggregates themselves will have changed. This occurs not only as a result of real economic growth but also because of differential movements in national prices in the respective countries concerned. There is an added complication; direct comparisons cannot be made in any robust way if there has also been any change in

the countries participating between the two time periods. The same countries must be compared from one period to another, not just the same number of countries. Furthermore, unless there is comprehensive coverage of countries, a true measure of global price change cannot be defined. If all countries of the World are not included in each benchmark, the result will otherwise remain deficient and incomplete.

9. The problem of inadequate and incomplete coverage has proved to be one of the most significant and intransigent obstacles to achieving consistency between the interpolation and extrapolation of single year benchmark estimates to other reference years on the one hand, and the results obtained directly from observations of the actual differences between those benchmark years on the other. Yet a further reason for the discrepancies between these estimates is the explicit adoption of national expenditure weights in deriving real growth rates in the first of these two methodologies as against the application, more appropriately for cross-country analysis, of unique implicit international sector level expenditure weights in the second procedure. Before looking at these technical questions, however, it is instructive to begin by reviewing in what different contexts these and other measures of global inflation have been used and could prove useful for analysis.

10. At the outset, however, it is important to note that certain analysts and observers have different objectives in mind in reviewing global inflation. At the most basic level, it is necessary to decide whether the primary purpose for measuring global inflation is to determine the overall change in international prices or whether it is to assess aggregate changes in global output. In principle, these two questions are the obverse image of each other, but the approach to their measurement-- just as at the respective distinct national levels-- can be quite different and, in practice, the basic condition "value is price times quantity ($V = P \times Q$)" may not be satisfied.

4 Use of Global Inflation Measures

11. To date, the most important application of a global price measurement approach is implicit and lies in the derivation of estimates of global real output change.

4.1 *Deflator of Global Output value*

12. It is relatively easy to understand why policymakers, and especially those with some sort of global mandate who serve with the international agencies, require estimates of global output. They also need to know how this aggregate is changing both geographically [regionally] and by commodity [sector] group. For those agencies concerned specifically with providing basic needs in developing countries or in assessing how well a key sector like agriculture is faring, it is essential to know whether the World's population can be fed. Agencies like UNICEF, UNDP and FAO want to determine how this can be achieved and, in so doing, assess whether minimum nutritional standards will be met. This is not simply a question of estimating global food crop aggregates, but a set of broader concerns related to trade and distribution logistics, counter-productive pressures on available supply coming from different sources and regions.

13. Other concerns about raising the level of the overall production of goods and services revolve around the possibility of providing a higher standard of living in general. Real output measures should reveal if this can be achieved in principle, while providing some indication of what actions might be needed to attain, for example, more equitable allocative objectives. Specifically, for international producers and suppliers of global products such as energy and other strategic raw materials, this information is clearly of direct market interest. It is also relevant to their longer term business plans. Furthermore, individual countries will often want to know how their respective contributions to global output [and to regional country groupings of output] in an overall GDP context have changed. At a more micro level, the detailed real expenditure data help analysts to determine market performance and how domestic outlays in various sectors measure up to total activity in these specific sectors.

4.2 *Global Price Index*

14. The case for devising measures of global price change, per se, may be less clear cut. To the majority of the World's citizens what really matters is not global inflation but domestic price increases and how such higher prices impact on their capacity to acquire the goods and services they desire to satisfy their well-being. National interest in global inflation probably extends only to how, through trade, the relative prices of a country's exports and imports affect people in their respective roles both as producers [or employees of producers] of internationally traded goods and services and as consumers of items made by the global economy. Since all prices [including labor costs] in such an international market sense are relative rather than absolute, what is important is how far a given 'wage' in a particular domestic currency provides enough to live on.

15. Nevertheless, for the international agencies-- and for those institutions with a global mandate to oversee financial stability-- awareness of the pace of international price change is critical. Other agencies shouldering a responsibility to enhance the process of development share an equal concern to monitor global inflation. They watch how prices in different countries move in relation to the trend in the overall international price level and how the poorer countries become progressively marginalized as the gap in price levels widens. This does not apply only to general price level change but also to more specific international raw material price movements, regional inflation and other sectoral price changes. PPP determined price level differences between countries should not be confused, however, with more conventionally understood 'terms of trade' effects which are related to changes in the relative prices of goods imported against those exported over time compared with a defined base reference period. If a country's imports become more expensive (in price terms) and its exports cheaper and less valuable, real income levels will fall. Adverse terms of trade effects of this nature compound the difference between a poor country's low price level and the much higher average international price level.

16. In some sense it might be argued that little or no meaning can be attached to a measure of global inflation. Whatever concept of price change is adopted, to be operationally useful, it has to be set against a specific standard or numeraire, other than itself, to give substance to a time to time comparison. Most other obvious potential 'value' standards and yardsticks probably will be moving in a similar direction, and so no other metric will remain static or constant. The value of transferable assets, and even of non-portable fixed assets like property, are likely to change in much the same way as underlying domestic prices. The value of other assets or durable commodities [such as tradable metals and the like] are going to be tied to their current costs of production and to fluctuations in the global demand for their use. Unless huge accumulated stocks exist and are held for purposes other than further processing, i.e., for speculative or precautionary [including strategic national security] reasons, prices will move in sympathy. This is where, at least historically, gold has always assumed a unique importance. If global inflation eventually does become a serious concern, it is arguable that gold will again become relevant as a commonly accepted indicative international store of value. It is important, however, to draw a clear distinction between 'international prices' that refer to the whole range of traded and non-traded domestic goods available on the market in all countries belonging to the international economy; and a more traditional perspective and use of the term 'international prices' that refers only to the border, and usually 'free on board', prices of internationally traded goods. [Furthermore, international trade in services is treated separately in this case].

5 **Currently Used Indicators of Global Prices and Output**

17. A variety of measures of global inflation have been compiled and put into practice by different institutions. These reflect a need to satisfy variously defined organizational objectives. For example, each year, just before the opening of the joint IMF-World Bank Annual Meetings, the IMF releases its latest projections of global growth. On the basis of implicit individual national assumptions about inflation, predictions are made about the global economy and the increase in global output. As described in more detail below, The World Bank adopts an entirely different approach to measuring international price change when putting together its widely recognized 'Atlas' measures of GNP per capita. But no estimate

that has been officially produced to date qualifies as a rigorous and legitimate measure of international price change. Indeed, given the huge discrepancies in national price movements occurring between countries [ignoring, for the moment, the very diverse means adopted for calculating national inflation in the countries concerned], it makes a big difference as to whether the intention is to look back in hindsight at how prices have moved in reaching their present position, or if the main aim is to look more traditionally at price changes in relation to some chosen 'normal' base reference point. The respective 'paasche' and 'laspeyres' approaches to aggregating the various national [or category] price changes give rise to very different answers, particularly because the GDP expenditure weights assigned are so very disparate by country, irrespective of whether international exchange rates or PPP conversion factors are used. As indicated earlier, there are also some intransigent practical problems to overcome in deciding how best to make PPP based comparisons across time.

18. A brief description follows of the various measures that have been used to date to calculate global inflation. Most are rather limited in their perspective and so some review of their suitability in different contexts is appropriate.

6 Measures of Global Inflation

19. Because international development agencies, such as the Bretton Woods institutions, need to be able to assess whether the total volume of goods and services produced in the World has in fact increased over a given time, it is useful for them to know also what level of global inflation has taken place. The same agencies would also find it useful, in their allocation of aid resources, to know whether a particular region or group of countries has experienced a faster rate of inflation than the average for the world economy as a whole. Furthermore, there might be considerable interest in keeping track of the current worth of the various elements that comprise the world's international reserves. From a more specific development perspective and a long recognized need to review the effectiveness of certain policies-- or, more specifically, given ideologies-- analysts should wish to compare performance within the setting of the global rate of change in prices.

20. Several conventional approaches have been taken on this issue. Most have failed to work effectively and fall short as meaningful measures of the issues that are becoming of increasing interest to policy analysts. The approaches have included the use of:

- The US national (GDP based) price index. This is often explicit in binary exchange rate-based comparisons and implicit in similar multilateral dollar based comparisons. This is not a good measure of international inflation, despite the apparent overwhelming 'dominance' of the US in the global economy and the linking of some currency baskets to the dollar in real [PPP] terms.
- The SDR deflator [in US dollar terms]. This is another measure of limited use representing only the underlying inflation of the major (G-5) industrialized countries in the world. Because it is a trade weighted rather than total product weighted measure, this raises issues of possible bias. This is the measure of global inflation used by the World Bank to update its exchange rate based "Operational Guidelines" and Atlas GNP per capita estimates.
- The global deflator for overall GNP, viz. the aggregate Global GNP in current market prices in US dollars divided by the equivalent Global GNP in constant 1995 market prices in US dollars. This is not only conceptually inappropriate, but also an approach that encounters many practical difficulties of time to time coverage. In practice, it gives rise to a volatile price series that has little meaning. This is mostly because varying dollar exchange rates need to be applied each year to the local currencies of different countries to convert all measures to a US dollar numeraire. But there are also difficulties relating to scope and coverage and the choice of a universally applicable "normal" base reference year across all countries to standardize the constant US dollar exchange rate as a "marker".

21. Two or three better methods have been suggested:

- A standard PPP 1993 GDP [or, respectively, consumption] weighting of individual national GDP deflators or CPIs. Most analysts would prefer a geographically more relevant GDP to a GNP deflator [despite the expenditure emphasis] but, at an international level, either of these deflators would be better than a CPI which, in practice, usually turns out to be a dominantly urban-based measure. Implicitly, the weights embedded in the index are mixed but there is some sound economic rationale for this.
- Population weighted GDP deflators or CPIs. The idea here is to have an individual impact measure rather than a price/outlay weighted measure to reflect how many people are suffering from high inflation. Essentially, this reflects the choice of a democratic v. a conventional plutocratic index-- but this approach has not found favor.
- As another possible first step, a better methodology might be to weight the separate country deflators by a GNP constant 1995 market price profile of values so that users could by-pass the “fallacy of composition” problem.

22. In assessing real output performance it is analytically important and meaningful to separate the different price patterns for agriculture, industry and services and to do so in a way consistent with what is done also for GDP. The main intention here is simply to find out whether any recorded global increase in value added has occurred primarily in the goods producing or the services producing sectors. It is difficult, however, to use PPPs as weights in this case because these are limited to expenditure and not output patterns. Maddison, et al., have made some bold attempts at compiling production level data based mainly on industrial census information, and others [Paige and Bombach] have readjusted the expenditure data to provide manufacturing sector information.

23. The Bank uses, for its Operational Guidelines, the SDR deflator as the measure of international inflation. But the weights are based only on the share of value of total trade and reserves controlled by the G-5 countries, and they are not related to the prices of all domestic goods and services. The SDR series are then converted to US dollars at official rates averaged for the period. The SDR deflator is thus a trade weighted composite of the G-5 countries GNP deflators. This has significance for trade and, perhaps, exchange rates but not for international inflation measurement.

7 Concluding Comments

24. Seen not as a global inflation measure but as an implicit growth index, it is tempting to conclude that the most appropriate measure of international inflation should be derived from the aggregation of individual national price indices weighted by the respective importance of each country's economy as measured by the purchasing power parity [PPP] value equivalent of its GDP in some recent base year. Even this series can be derived in different ways, depending on the level of disaggregation chosen, but here the analyst runs up against the very simple practical problem that PPP GDP estimates are not available for all countries, nor for all years, at least not as independently created measures. Should the baseline international GDP or GNP weights then be derived using official or average 'effective' exchange rates as measured against some standard currency such as the US dollar? This may make some sense if it can be argued that value in current international exchange rate terms is relevant to actual living standards. Evidence suggests that this is unlikely except in a broad cardinal sense. But according to traditional theory, there may be more reason to expect that relative PPPs will reflect to some extent observed changes in national prices. This is not, perhaps, a trivial practical question. Internal domestic price changes occur in markets determined by local demand and supply conditions assessed in domestic values. These values have been derived on the basis of national prices that only partially reflect international 'trade' prices. There seems to be no good theoretical alternative to using PPP country weighted national growth rates which in themselves have been weighted by PPP adjusted expenditure subaggregates.